

**TITLE 12 DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS**

**SUBTITLE 8 DIVISION OF OCCUPATIONAL SAFETY AND HEALTH**

**PART 11 ELEVATORS AND RELATED SYSTEMS**

**CHAPTER 230 ELEVATORS, DUMBWAITERS, ESCALATORS,  
AND MOVING WALKS**

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**Historical Note:** Chapter 230 of title 12 is based upon chapter 361 of the Hawaii Occupational Safety and Health Standards, Rules and Regulations. [Eff. 7/11/74; am 6/7/76; am 12/30/76; am 8/22/77; am 8/11/78; R 7/12/82]

**§12-230-1 General Requirements. (a)** All new and existing installations of elevators, dumbwaiters, escalators, and moving walks shall be reasonably safe to persons and property and in conformity with the provisions of this chapter.

**(b)** Conformity of all new installations of elevators, dumbwaiters, escalators, and moving walks with the applicable codes set forth in ASME A17.1, NFPA 70, the Uniform Building Code, equivalent standards acceptable to the department, or the provisions of this chapter shall be prima facie evidence that these installations are reasonably safe to persons and property. Existing installations shall comply with the edition of the ASME A17.1 codes in effect at the time of installation, unless modified in this chapter.

**(c)** Conditions found not in conformance with applicable requirements, which the owner, user, or contractor could not reasonably have been aware of, shall be regarded as discrepancies. All discrepancies shall be satisfactorily resolved as soon as possible. When, in the opinion of the department, a discrepancy constitutes a potentially serious or imminent hazard, it shall make an order to abate the condition within an appropriate time and may prohibit the use of the equipment until the condition is abated. Failure to correct discrepancies or failure to abate an unsafe condition within the time specified shall be deemed to be a violation.

**(d)** All passenger elevators shall have a clearly legible "Smoking Prohibited by Law" sign installed inside of the cab. Its letters shall not be less than 1 inch in height and shall be posted in elevators in buildings generally open to the public, including elevators in apartments, and other multi-unit residential buildings. The international no-smoking symbol may be posted in lieu of the above sign, provided that the diameter of the circle is not less than 4 inches. [Eff. 7/12/82; am 12/19/83; am 12/8/86; ren §12-230-1 and comp 12/6/90; am 11/5/93] (Auth: HRS §397-4) (Imp: HRS §397-4)

**§12-230-2 Out of service.** When it is intended to discontinue the use of an elevator or any other hoisting device covered by this chapter, the department shall be so notified by the owner or user. The hoistway doors or entrances shall be permanently boarded up or barricaded. The hoisting ropes shall be removed and the car and counterweights landed at the bottom of the hoistway. On elevators or devices not suspended by ropes, the power must be satisfactorily disconnected. Plunger elevators shall have the liquid line to the plunger disconnected. Prior to placing the hoisting device back into service the department shall be notified and an inspection made.  
[Eff. 7/12/82; am 12/19/83; ren §12-230-2 and comp 12/6/90] (Auth: HRS 397-4)  
(Imp: HRS §397-4)

**§12-230-3 Requirements for elevator installation.** Elevator installations shall conform to the provisions in this chapter. **(a) Hoistway enclosure.**

- (1) Where the hoistway enclosure is not of fire-resistive construction, the hoistway shall be fully enclosed. Enclosures and doors shall be unperforated to a height of 6 feet above each floor or landing and above the treads of adjacent stairways. Enclosures shall be so supported and braced as to deflect not over 1 inch when subjected to a force of 100 pounds applied horizontally at any point. Unperforated metal enclosures shall be equal to or stronger than No. 18 U.S. gauge sheet steel. Openwork enclosures may be used above the 6 foot level and shall reject a ball 2 inches in diameter and shall be either of wire grille at least No. 13 steel wire gauge or expanded metal at least No. 13 U.S. gauge.
- (2) The hoistway enclosure adjacent to a landing opening shall be of sufficient strength to support in true alignment the hoistway doors with their operating mechanism and locking devices.
- (3) Hoistway gates may be used for freight elevators not having fire-resistive requirements.
- (4) Hoistway gates when closed shall guard the full width of the landing openings and shall extend to a height of not less than 6 feet from the landing threshold. The gates shall reject a ball 1-1/2 inches in diameter.
- (5) Hoistway enclosures using materials other than gypsum board shall have all elevator entrance frames fully grouted at each landing. Enclosures using gypsum board material shall have the connection between the hoistway enclosure and the elevator entrance frames made using procedures approved by Underwriters Laboratories or by other agencies acceptable to the department.
- (6) Where four or more elevators serve all or the same portion of a building, they shall be located in not less than two hoistways, but in no case shall more than four elevators be located in any one hoistway.
- (7) Hoistways extending through more than two stories shall be vented directly to outside air. The area of vents shall not be less than 3.5 per cent of the cross-section area of the elevator shaft, with a minimum of 3 square feet per elevator.

**(b) Hoistway clearance between cars and landing sills.**

- (1) The clearance between the car-platform sills and the hoistway edge of any landing sill, or the hoistway side of any vertically sliding counterweighted hoistway door or of any vertically sliding counterbalanced bi-parting hoistway door, shall not be less than 1/2 inch where side guides are used, and not less than 3/4 inch where corner guides are used. The maximum clearance shall not be more than 1-1/2 inches.
- (2) Other horizontal clearances between the hoistway and car or counterweight shall not be less than 3/4 inch.
- (3) Vertical clearance above the car crosshead or below the car lowest structural member when the car is at the extreme limits of its movement shall not be less than 24 inches.
- (4) When the horizontal clearance between the general line of the hoistway and the elevator car top is greater than 16 inches, a restraining device shall be provided on the car top. All unenclosed hoistways shall be provided with a form of restraining device.

**(c) Landing sills, except those for elevators equipped with vertically sliding bi-parting counterbalanced doors or with vertically sliding counterweighted doors which slide down to open, shall be guarded on the underside with guard plates of smooth metal of not less than No. 16 U.S. gauge extending not less than the full width of the car entrance and securely fastened in place in accordance with the following:**

- (1) Where a car-leveling device is provided and the hoistway edge of the sill is either flush with or projects into the hoistway, the guard shall have a straight vertical face extending below the sill not less than the depth of the leveling zone plus 3 inches. Where the sill projects inward from the general line of the hoistway, the bottom of the guard shall also be beveled at an angle of not less than 60 degrees nor more than 75 degrees from the horizontal or the guard shall be extended from the hoistway edge of the landing sill to the header of the hoistway-landing door next below. Exception: These provisions shall not apply to freight elevators with sills not projecting inward from the general line of the hoistway; and
- (2) Where no car-leveling device is provided and the sill projects inward from the general line of the hoistway, the guard shall be either beveled at an angle of not less than 60 degrees nor more than 75 degrees from the horizontal or it may have a straight vertical face

extending from the hoistway edge of the landing sill to the header of the hoistway-landing door next below.

**(d)** The building corridors shall be so lighted that the illumination at the landing sills, when an elevator is at the landing with the doors open, shall not be less than 5 footcandles. When the hoistway doors are closed, the illumination shall not be less than 2 footcandles. This reading shall be taken immediately fronting the hoistway door at floor level.

**(e)** Pits.

(1) Safe and convenient access shall be provided to all pits and shall conform to the following:

- (A) Access may be by means of the lowest hoistway door or by means of a separate pit access door;
- (B) Access to pits extending more than 3 feet below the sill of the pit access door shall be provided by means of fixed vertical ladders of incombustible material, located within reach of the access door. The ladder shall extend not less than 42 inches above the sill of the access door, or handgrips shall be provided to the same height. The pit ladder shall have a clearance of at least 5 inches between the center of the rungs and the wall. The minimum clear width of the ladder shall be 16 inches. For installations made prior to 1978, the minimum pit depth requiring a ladder shall be 4 feet and the required height of the ladder or handgrips shall not be less than 30 inches above the sill of the access door; and

(C) Pits shall be accessible only to authorized persons.

(2) Where a separate pit access door is provided, it shall be self closing and provided with spring type lock arranged to permit the door to be opened from inside the pit without a key. These doors shall be kept locked.

(3) The switch for the pit light shall be on the same side of the access door as the pit ladder.

**(f)** Bumpers and buffers.

(1) Buffers of the spring, oil, or equivalent type shall be installed under the cars and counterweights of passenger elevators having a rated speed in excess of 50 feet per minute, and under the cars and counterweights of freight elevators having a rated speed in excess of 75 feet per minute.

(2) Spring buffers, or their equivalent may be used where the rated speed is less than 200 feet per minute or where an emergency terminal speed limiting device is installed in conformance with rule 209.4 of ASME A17.1 reducing the buffer striking speed to not more than 200 feet per minute.

(3) Approved oil buffers or their equivalent shall be used where the rated speed is in excess of 200 feet per minute and not reduced by a speed limiting device.

(4) For rated speeds not exceeding 50 feet per minute for passenger elevators or 75 feet per minute for freight elevators, if spring, oil, or equivalent-type buffers are not used, solid bumpers shall be installed.

**(g)** Machine rooms, penthouses, etc.

(1) Spaces containing machines, control equipment, sheaves, and other machinery shall be enclosed in enclosures of noncombustible

material not less than 6 feet high. If of openwork material, the enclosure shall reject a ball 2 inches in diameter.

(2) For all installations for which the plans were approved after 1981, machinery shall be so arranged that a clearance of not less than 18 inches is provided on 3 sides of drive motors, except that drive motors for hydraulic elevators and basement traction machines need to have the required clearance on only 2 sides.

(3) A metal or concrete floor shall be provided at the top of the hoistway. However, floors shall not be required below:

- (A) Secondary and deflecting sheaves of traction type machines located over the hoistway; or
- (B) Overhead sheaves, governors, and other equipment where the elevator machine is located below or at the side of the hoistway provided that safe means of access for inspection and servicing of governors is provided from outside the hoistway and sheaves and other equipment can be inspected and serviced from the top of

- the car, or safe means of access for inspecting and servicing are provided from outside the hoistway.
- (4) The floor shall be located above or level with the top of the machine beams where the machine is located over the hoistway, or, below the overhead sheaves where the machine is not located over the hoistway.
  - (5) The floor shall be capable of sustaining a concentrated load of 300 pounds on any 4 square inches; and where it constitutes the floor of the main or secondary level machinery space, it shall be designed for a live load of not less than 125 pounds per square foot in all open areas.
  - (6) Floors may be of concrete or of metal construction with or without perforations. Perforated metal floors shall conform to the following:
    - (A) If of bar-type grating, the openings between bars shall reject a ball 3/4 inch in diameter; or
    - (B) If of perforated sheet metal or of fabricated openwork construction, the opening shall reject a ball 1 inch in diameter.
  - (7) The floor may extend over the entire hoistway. Where it does not, the floor shall extend not less than 2 feet beyond the general contour of the machine or sheaves or other equipment, and to the entrance to the machinery space at or above the level of the platform. Where the floor does not cover the entire horizontal area of the hoistway, the open or exposed sides shall be provided with a standard railing not less than 42 inches high and a toeboard not less than 4 inches high, conforming to the requirements of ASME A12.1.
  - (8) Additional louvers or deflectors shall be installed as necessary to prevent rain from being blown into machinery components.
  - (9) A convenience outlet shall be installed in each machine room and machinery space.
  - (10) Sufficient ventilation shall be provided in each machine room to maintain the temperature at not over 95°F (35° C) for 95 per cent of the time, unless a lower temperature is specified by the elevator equipment manufacturer.
- (h)** Access to machine rooms and machinery spaces. A permanent, safe, and convenient means of access to elevator and dumbwaiter machine rooms and overhead machinery spaces shall be provided for authorized persons.
- (1) When a ship's ladder is used as a means of access, its construction shall comply with the dimensions shown in figure 230-1. Fold down stairs shall not be used as a means of access.
  - (2) Where passage over roofs is necessary to reach the means of access to machine rooms or machinery spaces, the following requirements shall be met for all installations made after 1958 or which have been modernized:
    - (A) A stairway shall be provided from the top floor of a building to the exit door at the roof level. The stairway shall have a maximum angle of 60 degrees from the horizontal and shall be equipped with a metal handrail on all open sides, provided that where vertical ladders giving reasonable safety are already installed it will not be necessary to replace them with stairs; and
    - (B) Where the passage is over a sloping roof having a slope exceeding 15 degrees from the horizontal, an unobstructed, permanent, and substantial walkway not less than 24 inches wide, equipped on at least one side with a standard railing not less than 42 inches high, shall be provided from the building exit door at the roof level to the means of access to the machine room or machinery spaces.
  - (3) Access doors to machine rooms and overhead machinery spaces shall be provided with spring type locks arranged to permit the door to be opened from the inside without a key. These doors shall be kept closed and locked except during periods when a qualified attendant is on duty in the room or space.
  - (4) Permanent electric lighting shall be provided in all machine rooms and machinery spaces.
  - (5) The illumination shall not be less than 10 footcandles at the floor level. The lighting control switch shall be located within easy reach of the access to these rooms or spaces. Where practicable, the light control switch shall be located at the lockjamb side of the access door.
- (i)** Hoistway entrances.

- (1) All passenger elevator hoistway entrance openings giving access to the car platform shall be provided with doors which will entirely fill the opening to the shaft, and when in the closed and locked position, they shall allow no more than 1/2 inch of movement at the bottom per panel. Freight elevators may use gates if in conformance with paragraphs (2) through (4) below.
- (2) If gates are used, they shall span the entire width of the opening and conform to the requirements of subsection (a)(1), (3), and (4) above for size and construction. Clearance between the gate and the hoistway landing sill shall not exceed 3/8 inch.
- (3) Gate counterweights shall run in guides or in boxes and be arranged to retain the weight in the box or guide.
- (4) All freight elevator and dumbwaiter hoistway doors or gates shall be provided with approved, hoistway unit system interlocks or combination mechanical locks and electrical contacts.
- (5) Power passenger elevator hoistway doors shall be equipped with hoistway unit system hoistway door interlocks.

Figure 230-1

Sufficient Opening To  
Provide Required Head Room

Minimum Head  
Room = 6'6"

20" Maximum

Handrail

Minimum Width  
of Ladder = 22"

Overlap  
Max = 1"  
Min = 1/2"

Maximum Rise per  
Flight = 12 feet

30" - 34"

6" Minimum

Maximum Rise = 12"

Turned Up Lip Prohibited  
Turned Down Lip Optional

60° Maximum

Dimension Limitations for a  
Reasonably Safe Ship's Ladder

- (6) The lowest landing hoistway door, where it is the pit access door, and one upper landing door which will permit access to the top of the car, shall be equipped with a switch or device that will provide a means of access to the hoistway for inspection, maintenance, or repairs.
- (j) Operation of an elevator in a leveling or truck zone at any landing by a car-leveling or truck-zoning device, when the landing doors or the car doors or gates, or both, are not in the closed position, is permissible subject to the following:
  - (1) Operating devices of manually operated car-leveling devices of truck-zoning devices shall be of the continuous pressure type located in the car;
  - (2) The entrance side of the platform of passenger and freight elevators equipped with leveling devices or truck-zoning devices shall be provided with smooth metal guard plates of not less than No. 16 U.S. gauge steel, or material of equivalent strength and stiffness, adequately reinforced and braced to the car platform. It shall:
    - (A) Extend not less than the full width of the widest hoistway door opening;
    - (B) Have a straight vertical face, extending below the floor surface of the platform, of not less than the depth of the leveling zone or the truck zone plus 3 inches;
    - (C) Have the lower portion of the guard bent back at an angle of not less than 60 degrees or more than 75 degrees from the horizontal; and
    - (D) Have the guard plate securely braced and fastened in place to withstand a constant force of not less than 150 pounds applied at right angles to and at any position on its face without deflecting more than 1/4 inch, and without permanent deformation.
  - (3) Where the car entrance on the truck-loading side is provided with a collapsible type gate and the height of the hoistway door opening is greater than the distance from the car floor to the car top, a head guard extending the full width of the door opening shall be provided on the car to close the space between the car top and the soffit of the hoistway door opening when the car platform is level with the floor at the truck-loading landing entrance;
  - (4) Where an elevator control is so arranged that the elevator will operate for leveling with the car door or gate open, the hoistway shall be smooth, plumb, and flush with the landing thresholds for the height of the leveling zone, plus 3 inches below the thresholds;
  - (5) The leveling zone at any landing shall not extend more than 30 inches above or 30 inches below any landing where an automatic leveling device is used, and not more than 10 inches above and below where a manually operated leveling device is used;
  - (6) The truck zone at any landing shall not extend more than 5-1/2 feet above the landing;
  - (7) Where a truck or leveling zone for one hoistway entrance extends into the door interlocking zone for a second entrance, the truck-zoning or leveling operation shall be inoperative unless the hoistway door at the second entrance is in the closed position. Where a truck or leveling zone for one hoistway entrance extends into the leveling zone for a second entrance, the leveling operation for the second entrance shall be inoperative while the hoistway door at the first entrance is open. However, the car may be operated by a car-leveling device at any landing having two hoistway entrances within 2 inches of the same level, with both car doors or gates and the corresponding hoistway doors open, provided landing-sill guards conforming to subsection (c) above are installed at both floors; and
  - (8) A leveling or truck-zoning device shall not move the car at a speed exceeding 150 feet per minute.



- (k) Automatic normal terminal stopping devices.
  - (1) Upper and lower normal terminal stopping devices shall be provided and arranged to slow down and stop the car automatically, at or near the top and bottom terminal landings, with any load up to and including rated load in the car and from any speed attained in normal operation. These devices shall function independently of the operation of the operating device and of the final terminal stopping device. The device shall be so designed and installed that it will continue to function until the final terminal stopping device operates.
  - (2) Stopping switches for normal terminal stopping devices shall be located as follows:
    - (A) Stopping switches for traction machines shall be located on the car, in the hoistway, or in the machine room and shall be operated by the movement of the car; and
    - (B) Stopping switches for winding drum machines shall be located on the car or in the hoistway and shall be operated by the movement of the car.
  - (3) Stopping switches located in a machine room shall conform to the following:
    - (A) The stopping switch contacts shall be mounted on and operated by a stopping device mechanically connected to and driven by the car. Stopping devices depending on friction and traction shall not be used;
    - (B) Tapes, chains, ropes, or similar devices, mechanically connecting the stopping device to the car and used as a driving means, shall be provided with a device which will cause the electric power to be removed from the elevator driving-machine motor and brake if the driving means fails; and
    - (C) Only one set of floor-stopping contacts shall be necessary for each terminal landing on floor controllers or other similar devices used to stop the car automatically at the landings (such as automatic operation, signal operation, etc.) provided these contacts and the means for operating them conform to paragraphs (1) and (2) above. These contacts may then serve also as normal terminal stopping devices. The provisions of this paragraph shall not apply to hydraulic elevators. On hydraulic elevators, the device required by subparagraph (B) above shall cause the electrical power to be removed from the main control valve operating magnets and, in the case of electrohydraulic elevators, from the pump motor.
  - (4) All shipper rope operated elevators shall have the shipper rope provided with stop balls to bring the car automatically to a stop within the top and bottom runby of the car.
- (l) Final terminal stopping devices for all electric elevators except hydraulic elevators.
  - (1) Final terminal stopping devices shall be provided and arranged to cause the electric power to be removed automatically from the elevator driving-machine motor and brake after the car has passed a terminal landing. The device shall be set to function as close to the terminal landing as practicable, but so that under normal operating conditions it will not function when the car is stopped by the normal terminal stopping device. Where spring buffers are provided, the device shall function before the buffer is engaged.
  - (2) The device shall be so designed and installed that it will continue to function:

- (A) At the top terminal landing, until the car has traveled above this landing a distance equal to the counterweight runby plus 1-1/2 times the buffer stroke, but in no case less than 2 feet; and
  - (B) At the bottom terminal landing until the car rests on its fully compressed buffer.
- (3) The operation of final terminal stopping devices shall prevent movement of the car by the normal operating devices in both directions of travel.
- (4) Final terminal stopping devices shall be located as follows:
  - (A) Elevators having traction machines shall have final terminal stopping switches located in the hoistway and operated by cams attached to the car; or
  - (B) Elevators having winding drum machines shall have final terminal stopping switches located on and operated by the driving machine and also stopping switches located in the hoistway and operated by cams attached to the car.
- (5) The normal and final terminal stopping device shall not control the same controller switches unless two or more separate and independent switches are provided, two of which shall be closed to complete the driving-machine, motor-and-brake circuit in either direction of travel. Where a 2- or 3-phase alternating current driving-machine motor is used, these switches shall be of the multi-pole type.
- (6) The control shall be so designed and installed that single ground or short circuit may permit either, but not prevent both, the normal and final stopping device circuits from stopping the car.
- (7) Final terminal stopping devices for drum machines shall conform to the following:
  - (A) Stopping switches, located on and operated by the driving machine, shall not be driven by chains, ropes, or belts; or
  - (B) Where a 2- or 3-phase alternating current driving-machine motor is used, the main line circuit to driving-machine motor and the circuit of the driving-machine brake coil shall be directly opened either by the contacts of the machine stop switch or by stopping switches mounted in the hoistway and operated by a cam attached to the car. The opening of these contacts shall occur before or coincident with the opening of the final terminal stopping switch as provided in paragraph (1) above. However, this provision shall not apply to driving machines equipped with a direct current brake and having a direct current, main line control switch in the driving-machine motor circuit controlled by a final terminal stopping switch located in the hoistway and operated by a cam attached to the car.
- (m) Elevators having winding drum machines shall be provided with a slack-rope device equipped with a slack-rope switch of the enclosed manually reset type which shall cause the electric power to be removed from the elevator driving-machine motor and brake if the hoisting ropes become slack.
- (n) Car enclosures.
  - (1) Elevator cars, except for the sides used for entrance and exit, shall be permanently enclosed on all sides and the top. However, car tops are not required for sidewalk elevators.
  - (2) The enclosure shall be securely fastened to the car platform and so supported that it cannot loosen or become displaced in ordinary service or on the application of the car safety or on buffer engagement.
  - (3) Tops of car enclosures shall be so designed and installed as to be capable of sustaining a load of 300 pounds on any square area 2 feet on a side and 100 pounds applied at any point. Simultaneous application of these loads is not required.

- (4) A working platform or equipment which is not required for the operation of the elevator or its appliances, except where specifically provided shall not be located above the top of an elevator car.
- (5) Glass used in elevator cars shall comply with rule 204.1h of ASME A17.1 except that where glass is used for the car enclosure or the doors, the minimum thickness shall be 1/2 inch and the plastic interlayer shall have a thickness of 0.045 inch to 0.060 inch.
- (6) Enclosures shall be of metal without perforations to the height of not less than 6 feet above the platform floor. Above the 6 foot level the walls and top of the enclosure shall be metal with or without perforations, except that portion of the enclosure wall in front of and extending 6 inches on each side of the counterweight which shall be without perforations. Perforated portions of enclosures shall reject a ball 1-1/2 inches in diameter.
- (o) Car doors or gates.
- (1) All passenger and freight elevators shall be equipped with electrically contacted car doors or gates which span the entire width of the entrance openings to a height of at least 6 feet for freight elevators and to the full height of the opening for passenger elevators. This requirement shall not apply to freight elevators nor to the entrance nearest the operator on passenger elevators, in either of which the operator in the car is in sole control of the car and the operating device is so arranged as to stop the car if the hand of the operator is removed from it in other than the leveling zone. Every secondary entrance on a passenger elevator shall be provided with an electrically contacted door or gate. Contacted car doors or gates shall not be required on lever, wheel, or shipper-rope operated hydraulic elevators and shipper-rope operated electric powered elevators operable only from within the car.
- (2) Car door panels shall conform to the following:
  - (A) The panels shall overlap the top and sides of the opening and each other, in the case of multispeed entrances, by not less than 5/8 inch (16 mm);

- (B) The clearance shall not exceed 3/8 inch (9.5 mm) between:
    - (i) The panel and the frame; and
    - (ii) Related panels of multispeed entrances;
  - (C) The leading panel edge of side opening entrances shall not close into pockets in the strike jamb and shall be smooth and free of sharp projections;
  - (D) The meeting panel edges of center opening entrances shall be smooth and free of sharp projections. The meeting panel edges of center opening entrances shall be protected with not less than 1 resilient male member extending the full height of the panel. The meeting edges may interlock by not more than 3/8 inch (9.5 mm);
  - (E) The entrance assembly shall be capable of withstanding a force of 250 lbf (1112 N) applied on the car side at right angles to and approximately at the center of a panel. This force shall be distributed over an area of approximately 4 inches (102 mm) by 4 inches (102 mm). There shall be no appreciable permanent displacement or deformation of any parts of the entrance assembly resulting from this test.
- (3) Side emergency exit doors shall not be permitted.
- (p)** Car and counterweight safeties.
- (1) The car of every elevator suspended by wire ropes shall be provided with one or more car safety devices of the following types:
- (A) Type A safeties. Safeties which develop a rapidly increasing pressure on the guide rails during the stopping interval, the stopping distance being very short due to the inherent design of the safety. The operating force is derived entirely from the mass and the motion of the car or the counterweight being stopped. These safeties apply pressure on the guide rails through eccentrics, rollers, or similar devices, without any flexible medium purposely introduced to limit the retarding force and increase the stopping distance; or
  - (B) Type B safeties. Safeties which apply limited pressure on the guide rails during the stopping interval, and which provide stopping distances that are related to the mass being stopped and the speed at which application of the safety is initiated. Retarding forces are reasonably uniform after the safety is fully applied. Continuous tension in the governor rope may or may not be required to operate the safety during the entire stopping interval; or
  - (C) Type C safeties (Type A with oil buffers). Safeties which develop retarding forces during the compression stroke of one or more oil buffers interposed between lower members of the car frame and a governor operated type A auxiliary safety plank applied on the guide rails. The stopping distance is equal to the effective stroke of the buffers.
- (2) The safeties shall be attached to the car frame, and one safety shall be located within or below the lower members of the car frame (safety plank).
- (3) All car safeties shall be mounted on a single car frame and shall operate with only one pair of guide rails between which the frame is located.
- (4) The safety device, or the combined safety devices where furnished, shall be capable of stopping and sustaining the entire car with its rated load from governor tripping speed.
- (5) No car safety device shall be used for a greater total load or speed than that specified by the manufacturer.
- (6) Safeties shall not stop an ascending car or counterweight.
- (7) Car safeties, and counterweight safeties, where provided, shall be actuated by separate speed governors. However, sidewalk elevators

having a rated speed less than 50 feet per minute may be provided with broken rope type safeties in lieu of speed governor actuated safeties, and speed governors shall not be required for the operation of counterweight safeties of elevators having a rated speed of less than 150 feet per minute.

- (q)** Car speed governors.
  - (1)** Speed governors for car safeties shall be set to trip at overspeeds as follows:
    - (A)** At not less than 115 per cent of rated speed; and
    - (B)** At not more than the tripping speed permitted by ASME A17.1 for existing elevators.
  - (2)** Speed governors shall have their means of speed adjustment sealed after test. If speed governors are painted after sealing, all bearing and rubbing surfaces shall be kept free or freed of paint and a hand test made to determine that all parts operate freely as intended. Seals shall be of a type which will prevent readjustment of the governor tripping speed without breaking the seal.
  - (3)** A metal plate shall be securely attached to each speed governor and shall be marked in a legible and permanent manner with letters and figures not less than 1/4 inch in height indicating the following:
    - (A)** The speed in feet per minute at which the governor is set and sealed to trip the governor-rope-grip jaws; and
    - (B)** The size, material, and construction of the governor rope on which the governor jaws were designed to operate.
  - (4)** The use of U-bolt type rope clips for governor rope fastenings shall be prohibited.
- (r)** Car lighting.
  - (1)** Cars shall be provided with not less than two electric lights.
  - (2)** The minimum illumination at the landing edge of the car platform, when the car and landing doors are closed, shall not be less than the following:
    - (A)** For passenger elevators, 5 footcandles; and
    - (B)** For freight elevators, 2-1/2 footcandles.
  - (3)** A guard of fire retardant material shall be provided for each car light.
- (s)** Operation and control.
  - (1)** A control station with emergency stop switch shall be provided on top of the car located on or near the crosshead, so as to be readily accessible from the hoistway entrance. An emergency stop switch in the pit located so as to be readily accessible from the pit access doorway. When opened any switch shall cause the electrical power to be removed from the elevator driving-machine motor and brake.
  - (2)** Emergency stop switches shall:
    - (A)** Be of the manually opened and closed type;
    - (B)** Have red operating handles or buttons;
    - (C)** Be conspicuously and permanently marked, "STOP"; and
    - (D)** Be positively opened mechanically and their opening shall not be solely dependent on springs.
  - (3)** In-car stop switch. On passenger elevators equipped with nonperforated enclosures, a stop switch, either key operated or behind a locked cover, shall be provided in the car and located in or adjacent to the car operating panel. The switch shall be clearly and permanently marked "STOP" and shall indicate the stop and run positions. The switch shall be positively opened mechanically and its opening shall not be solely dependent on springs. When opened, this switch shall cause the electric power to be removed from the elevator driving-machine motor and brake.
  - (4)** Shipper, lever, or wheel-operated, hydraulic elevators shall not be required to be provided with emergency stop switches in the car.
  - (5)** Car-switch or hand-lever operating levers shall be so arranged that the movement of the lever towards the entrance door the operator normally

faces will cause the car to descend, and the movement of the lever away from the door will cause the car to ascend.

- (6) Every electric or electro-hydraulic powered elevator operated by hand rope or other non-self-centering device shall be provided with a sequence relay or other device which will prevent the operation of the car after an interruption of the current to the driving machine until the operating device has first been returned to the inoperative position.

(t) Emergency power supply for signaling devices and lighting. Not later than one year from the effective date of this chapter, each existing elevator, except sidewalk elevators not so equipped, shall be provided with a source of emergency power for the signaling devices and lighting as required by rules 211.1 and 204.7a(3) of ASME A17.1. If the audible signaling device, or the means of 2-way conversation, or the car lighting are normally connected to the building power supply, they shall automatically transfer to the source of emergency power within 10 seconds after the normal power supply fails. The emergency power source shall provide illumination of not less than 0.2 of a footcandle 4 feet above the car floor and approximately 1 footcandle in front of the car operating device. Not less than two lamps of approximately equal wattage shall be used. The emergency power source shall be capable of providing for the operation of the audible signaling device for at least 1 hour and the means of 2-way conversation and lighting for at least 4 hours. When the means of communications connects with an answering service, such answering service shall be equipped with emergency power. Exception: Freight elevators installed before 1978 which have a rise of less than 25 feet under the control of one owner or user, and which can be positively placed out of service at least 30 minutes before the close of business each day shall not be required to have a means of communication but shall be equipped with a source of emergency power for signaling and lights.

(u) Standby power shall be provided to at least one elevator in each bank for every building where the highest floor level of human occupancy is more than 75 feet above the lowest level of fire department vehicle access. This standby power shall be transferable to any other elevator in the bank and shall be capable of operating the elevator with a full load at a speed of not less than 150 feet per minute. Standby power shall be provided by an approved self-contained generator set, or any other self-contained system such as batteries, to operate whenever there is a loss of power in the normal house current. When a generator is used, it shall be in a separate room having at least a 1 hour, fire-resistive occupancy separation from the remainder of the building and shall have sufficient fuel supply to operate the equipment for 2 hours. When any other self-contained system is used, it shall have sufficient reserve power to operate the equipment for 2 hours.

(v) Only the electrical wiring, raceways, and cables used directly in connection with the elevator, including wiring for signals, for communication with the car, for lighting, heating, air conditioning, and ventilating the car, for pit sump pumps, and for heating and lighting the hoistway or machine room, shall be installed inside the hoistway or in the machine room. [Eff. 7/12/82; am 12/19/83; am 12/8/86; am and ren §12-230-3 and comp 12/6/90; am 11/5/93; am 7/6/98] (Auth: HRS §397-4) (Imp: HRS §397-4)

**§12-230-4 Requirements for installation of electrical equipment and wiring. (a)** The nominal voltage used for elevator, dumbwaiter, escalator, and moving-walk operating control and signaling circuits, operating equipment, driving machine motors, machine brakes, and motor-generator sets shall not exceed the following:

- (1) Three hundred volts for operating control and signaling circuits and related equipment, including door operator motors. Exception: Higher potentials shall be permitted for frequencies of 25-through 60-hertz alternating current (ac) or for direct current (dc) provided the current in the system cannot, under any conditions, exceed 8 milliamperes for ac or 30 milliamperes for dc; or
- (2) Six hundred volts for driving machine motors, machine brakes, and motor-generator sets. Exception: Higher potentials shall be permitted for driving motors of motor-generator sets. All live parts of electric apparatus in the hoistways, at the landings, or in or on the cars of elevators and dumbwaiters, or in the wellways or the landings of escalators or moving walks shall be enclosed to protect against accidental contact.

**(b) Conductors.**

- (1) The insulation of conductors installed in connection with elevators, dumbwaiters, escalators, and moving walks shall comply in accordance with subparagraphs (A) through (E) below:
  - (A) Conductors from control panels to main circuit resistors shall be flame-retardant and suitable for a temperature of not less than 194° F (90° C). All other wiring on control panels shall be flame-retardant and moisture-resistant;
  - (B) The conductors to the hoistway door interlocks from the hoistway riser shall be flame-retardant, moisture-resistant, and suitable for a temperature of not less than 392° F (200° C);
  - (C) Traveling cables used as flexible connections between the elevator or dumbwaiter car and the raceway shall either conform to the types set forth in NFPA 70, section 400-4, or other approved types;
  - (D) All other conductors located in raceways, in or on the cars of elevators and dumbwaiters, in the wellways of escalators and moving walks, and in the machine room of elevators, dumbwaiters, escalators, and moving walks shall have flame-retardant and moisture-resistant insulation; and
  - (E) The thickness of the insulation of all conductors shall be suitable for the voltage to which the conductors are subjected.

Conductors shall be Type MTW, TF, TFF, TFN, TFFN, THHN, THW, THWN, TW, XHHW, or any other conductors with insulation designated as flame retardant. Shielded conductors shall be permitted providing such conductors are insulated for the maximum voltage found in the cable or raceway system.

- (2) The minimum size of conductors used for elevator, dumbwaiter, escalator, and moving-walk wiring, other than conductors that form an integral part of control equipment, shall be as follows:
  - (A) Traveling cables for lighting circuits: No. 14. Exception: No. 20 or larger conductors shall be permitted in parallel provided the ampacity is equivalent to at least that of the No. 14 wire;
  - (B) Operating control and signaling circuits: No. 20; and
  - (C) All other operating control and signaling circuits: No. 24.
- (3) Motor circuit conductors supplying elevator, dumbwaiter, escalator, or moving-walk motors shall have an ampacity in accordance with subparagraphs (A) through (C) below based on the nameplate current rating of the motors. With generator field control, the ampacity shall be based on the nameplate current rating of the driving motor of the motor-generator set which supplies power to the elevator motor.
  - (A) Conductors supplying a single motor shall have an ampacity in conformance with NFPA 70, section 430-22, and Table 430-22(a) Exception.
  - (B) Conductors supplying two or more motors shall have an ampacity of not less than 125 per cent of the nameplate current rating of the highest rated motor in the group plus the sum of the nameplate current ratings of the remainder of the motors in the group.

- (C) Feeder demand factor for conductors of less ampacity than required by subparagraph (B) above shall be permitted subject to the requirements of NFPA 70, section 430-26, and Table 620-15.
- (c) Wiring methods.**
  - (1) Conductors located in hoistways, in escalator and moving-walk wellways, in or on cars, and in machine and control rooms, not including the traveling cables connecting the car and hoistway wiring, shall be installed in rigid metal conduit, intermediate metal conduit, electrical metallic tubing, wireways, or be Type MC or MI cable.
    - (A) Exception 1: Flexible metal conduit or Type AC cable shall be permitted in hoistways and in escalator and moving-walk wellways between risers and limit switches, interlocks, operating buttons, and similar devices. Class 2 power-limited cable (30 volts RMS or less or 42 Vdc or less), shall be permitted to be installed between risers and signal fixtures and within escalators and moving walkways where supported and protected from physical abuse.
    - (B) Exception 2: Flexible metal conduit or Type AC cable, not exceeding 6 feet 6 (1.83) in length, shall be permitted on cars where so located as to be free from oil and if securely fastened in place.
    - (C) Exception 3: Hard service cords and junior hard service cords conforming to the requirements of NFPA 70, Article 400 (Table 400-4), shall be permitted as flexible connections between the fixed wiring on the car and devices on the car doors or gates. Hard service cords only shall be permitted as flexible connections for the top-of-car operating device or the car-top work light. These devices or fixtures shall be grounded by means of an equipment grounding conductor run with the circuit conductors.
    - (D) Exception 4: Flexible metal conduit or Type AC cable, not exceeding 6 feet (1.83 m) in length, shall be permitted between control panels and machine motors, machine brakes, motor-generator sets, and pump unit motors and valves. Conductors shall also be permitted to be grouped together and taped or corded without being installed in a raceway. Such cable groups shall be supported at intervals of not more than 3 feet (914 mm) and so located as to be free from physical damage.
    - (E) Exception 5: Flexible metal conduit of 3/8 inch nominal trade size shall be permitted in lengths not in excess of 6 feet (1.83 m).
    - (F) Exception 6: Hard service cords conforming to the requirements of NFPA 70, Article 400 (Table 400-4), shall be permitted as flexible connections on escalators or moving walk control panels and disconnecting means where the entire control panel and disconnecting means are arranged for removal from machine spaces as permitted in NFPA 70, Section 620-72, Exception.
  - Where motor-generators and machine motors are located adjacent to or underneath control equipment and are provided with extra length terminal leads not exceeding 6 feet (1.83 m) in length, such leads shall be permitted to be extended to connect directly to controller terminal studs. Auxiliary gutters shall be permitted in machine and control rooms between controllers, starters, and similar apparatus.
  - (2) On multicar installations, a separate branch circuit shall be used to supply the car lights for each elevator.
- (d) Installation of conductors.**
  - (1) Raceway terminal fittings. Conductors shall comply with NFPA 70, section 300-16(b). In locations where conduits project from the floor and terminate in other than a wiring enclosure, they shall extend at least 6 inches (152 mm) above the floor.
  - (2) NFPA 70, section 362-5, shall not apply to wireways. The sum of the cross-sectional area of the individual conductors in a wireway shall not be more than 50 per cent of the interior cross-sectional area of the wireway. Vertical runs of wireways shall be securely supported at intervals not to exceed 15 feet (4.57 m) and shall have not more than one joint between supports. Adjoining wireway sections shall be securely fastened together to provide a rigid joint.
  - (3) The sum of the cross-sectional area of the operating and control circuit conductors in raceways shall not exceed 40 per cent of the interior cross-sectional area of the raceway as permitted in paragraph (2) above.



- (4) Supports for cables or raceways in a hoistway or in an escalator or moving-walk wellway shall be securely fastened to the guide rail or to the hoistway or wellway construction.
- (5) Auxiliary gutters (wiring troughs) shall not be subject to the restrictions of NFPA 70, sections 374-2 and 374-5, regarding length or number of conductors.
- (6) Different systems in one raceway or traveling cable. Conductors for operating, control, power, signaling, and lighting circuits of 600 volts or less shall be permitted to be run in the same traveling cable or raceway system if all conductors are insulated for the maximum voltage found in the cables or raceway system and if all live parts of the equipment are insulated from ground for this maximum voltage. Such a traveling cable or raceway shall also be permitted to include a pair of telephone conductors for the care telephone, provided such conductors are insulated for the maximum voltage found in the cable or raceway system.
- (7) Wiring in hoistways. Main feeders for supplying power to elevators and dumbwaiters shall be installed outside the hoistway. Only electric wiring, conduits, and cables used directly in connection with the elevator or dumbwaiter, including wiring for signals, for communication with the car, for lighting and ventilating the car, and wiring for fire-detecting system for the hoistways, shall be permitted inside the hoistway.
- (8) Electric equipment and wiring used for elevators, dumbwaiters, escalators, moving walks in garages, and similar occupancies shall comply with the requirements of NFPA 70, article 511. Wiring and equipment located on the underside of the car platform shall be considered as being located in the hazardous area.
- (9) Sidewalk elevators with sidewalk doors located exterior to the building shall have all electric wiring in rigid metal conduit, intermediate metal conduit, liquid tight flexible metal conduit or electrical metallic tubing and all electrical outlets, switches, junction boxes, and fittings shall be weatherproof.
- (e)** Traveling cables.
  - (1) Traveling cables shall be so suspended at the car and hoistways' ends to minimize the strain on the individual copper conductors. Traveling cables shall be supported by one of the following means:
    - (A) By its steel supporting fillers; or
    - (B) By looping the cables around supports for unsupported lengths less than 100 feet (30.5 m); or
    - (C) By suspending from the supports by a means that automatically tightens around the cable when tension is increased for unsupported lengths up to 200 feet (61 m).
  - (2) In hazardous (classified) locations, traveling cables shall be of a type approved for hazardous (classified) locations and shall comply with NFPA 70 Sections 501-11, 502-12, or 503-10, as applicable.
  - (3) Traveling cable supports shall be so located to minimize the possibility of damage resulting from contact with the hoistway construction or equipment in the hoistway. Where necessary, suitable guards shall be provided to protect the cables against damage.
  - (4) Installation of traveling cables shall be permitted to be run without the use of raceway or conduit for a distance not exceeding 6 feet (1.83 m) in lengths as measured from the first point of support on the elevator car or hoistway wall, providing the conductors are grouped together and taped or corded or in the original sheath. Traveling cables may be continued to elevator control panels and to elevator cars and machine room connections, as fixed wiring, providing it is suitably supported and protected from damage.
- (f)** Control.
  - (1) Elevators and kindred equipment shall have a single means for disconnecting all ungrounded main power supply conductors for each unit. Where multiple driving machines are connected to a single elevator, escalator, moving walk, or pumping unit, there shall be a single disconnecting means to disconnect the motor(s) and control valve operating magnets. Where there is more than one driving machine in a machine room, disconnecting means shall be conspicuously numbered to correspond to the number of the driving machine which they control.
    - (A) The disconnecting means shall be an enclosed externally operable fused motor circuit switch or circuit breaker arranged to be locked in the open position (with a

padlock). No provision shall be made to close this disconnecting means from any other part of the premises, nor shall circuit breakers be opened automatically by a fire alarm system.

- (B) The disconnecting means shall be located within the elevator machine room where it is readily accessible to qualified persons.
  - (i) On elevators without generator field control, the disconnecting means shall be located within sight of the power converter or motor starter. When the disconnecting means is not within sight of the hoist machine or control panel, an additional manually operated switch shall be installed adjacent to the remote equipment, connected in the control circuit to prevent starting.
  - (ii) On elevators with generator field control, the disconnecting means shall be located within sight of the motor starter for the driver motor of the motor-generator set. When the disconnecting means is not within sight of the hoist machine, the control panel, or the motor generator set, an additional manually operated switch shall be installed adjacent to the remote equipment, connected in the control circuit to prevent starting.
  - (iii) On escalators and moving walks, the disconnecting means shall be installed in the space where the controller is located.
- (2) On single or multicar installations, equipment receiving electrical power from more than 1 source shall be provided with a disconnecting means from each source of electrical power within sight of the equipment served.
- (3) Where multiple disconnecting means are used and parts of the control panel remain energized from a source other than the one disconnected, a warning sign shall be conspicuously mounted on or adjacent to the disconnecting means. The sign shall be clearly legible and shall read "Warning - Parts of the control panel are not de-energized by this switch".
- (4) Where interconnections between control panels are necessary for the operation of the system on multicar installations that remain energized from a source other than the one disconnected, a warning sign, in accordance with paragraph (3) above, shall be mounted on or adjacent to the disconnecting means.

- (5) Phase protection.
  - (A) Electric elevators driven by polyphase ac motors shall be provided with a means to prevent starting of the elevator motor when either the phase rotation is in the wrong direction or when there is a failure in any phase.
  - (B) Hydraulic elevators powered by a polyphase ac motor shall be provided with the means to prevent overheating of the drive system (pump and motor) due to phase rotation reversals or failure.
- (6) Elevators shall have a single means for disconnecting all ungrounded car light power supply conductors for each unit. Where there is equipment for more than one car in the machine room, disconnecting means shall be numbered to correspond to the number of the elevator car whose lights source they control. The disconnecting means shall be fused or manually reset circuit breaker and arranged to be locked in the open position (with a padlock) and shall be located in the machine room for that car.
- (g) Overcurrent protection.
  - (1) Control and operating circuits and signaling circuits shall be protected against overcurrent in accordance with the requirements of NFPA 70, section 725-12.
  - (2) Motors.
    - (A) Duty on elevator and dumbwaiter driving machine motors and driving motors of motor-generators used with generator field control shall be classed as intermittent. Such motors shall be protected against overcurrent in accordance with NFPA 70, section 430-33.
    - (B) Duty on escalator and moving-walk driving machine motors shall be classed as continuous. Such motors shall be protected against overcurrent in accordance with NFPA 70, section 430-32.
    - (C) Escalator and moving-walk driving machine motors and driving motors of motor-generator sets shall be protected against running overcurrent as provided in NFPA 70, section 430-37.
    - (D) Circuits for lighting, fans, etc., shall be protected in accordance with NFPA 70, section 725-12. The disconnecting means shall be located within the elevator machine room and be of the fused or manually reset circuit breaker type.
- (h) Machine room.
  - (1) Guarding equipment for elevator, dumbwaiter, escalator, and moving-walk driving machines, motor-generator sets, motor controllers, and disconnecting means shall be installed in a room or enclosure set aside for that purpose. The room or enclosure shall be secured against unauthorized access. Exception: Dumbwaiter, escalator, or moving-walk motor controllers shall be permitted outside the spaces herein specified, provided they are enclosed in cabinets with doors or removable panels capable of being locked in the closed position and the disconnecting means is located adjacent to the motor controller. Such cabinets shall be permitted in the balustrading on the side away from the moving steps or moving treadway.
  - (2) Clearances around control panels and disconnecting means shall be provided to allow safe and convenient access to all live parts of the equipment necessary for maintenance and adjustment. The minimum clear working space about live parts on control panels and disconnecting means shall be in conformance with NFPA 70, section 110-16.
    - (A) Exception: Where an escalator or moving walk control panel and disconnecting means are mounted in the same space as the escalator or moving walk drive machine and the clearances specified cannot be provided, the clearance requirements outlined in NFPA 70, section 110-16, shall be permitted to be waived where the entire panel and disconnecting means are arranged so that they can be readily removed from the machine space and are provided with flexible leads to all external connections.

- (B) If control panels are not located in the same space as the drive machine, they shall be located in cabinets with doors or removable panels capable of being locked in the closed position. Such cabinets shall be permitted in the balustrading on the side away from the moving steps or moving treadway.
- (i) Grounding.
  - (1) Metal raceways attached to conduits, Type MC cables, or Type AC cables attached to elevator cars shall be bonded to grounded metal parts of the car with which they come in contact.
  - (2) For electric elevators, the frames of all motors, elevator machines, controllers, and the metal enclosures for all electric devices in or on the car or in the hoistway shall be grounded.
  - (3) For nonelectric elevators, the metal frame of the car, where normally accessible to persons, shall be grounded.
  - (4) Equipment mounted on members of the structural metal frame of a building shall be considered to be inherently grounded. Metal car frames supported by metal hoisting cables attached to running over sheaves or drums of elevator machines shall be considered to be grounded where the machine is grounded in accordance with NFPA 70, article 250.
- (j) Overspeed.
  - (1) Overspeed protection for elevators under overhauling load conditions shall be provided with a means on the load side of each elevator power disconnecting means to prevent the elevator from attaining a speed equal to the governor tripping speed or a speed in excess of 125 per cent of the elevator rated speed, whichever is the lesser. Overhauling load conditions shall include all loads up to rated elevator loads for freight elevators and all loads up to 125 per cent of rated elevator loads for passenger elevators.
  - (2) Motor-generators driven by dc motors and used to supply direct current for the operation of elevator machine motors shall be provided with speed-limiting devices in conformance with NFPA 70, section 430-89(c), that will prevent the elevator from attaining at any time a speed of more than 125 per cent of its rated speed.
  - (3) An elevator can be powered by an emergency power system provided that, when operating on such emergency power, there is conformance with paragraph (1) above. Exception: Where the emergency power system is designed to operate only one elevator at a time, the energy absorption means, if required, shall be permitted on the power side of the disconnecting means, provided all other requirements are in conformance when operating any of the elevators the system might serve.
    - (A) Other building loads, such as power and light that can be supplied by the emergency power system, shall not be considered as means of absorbing the regenerated energy for the purpose of conforming to paragraph (1) above unless such loads are using their normal power from the emergency power system when it is activated.
    - (B) The disconnecting means, as outlined in section 12-230-4(f)(1), shall disconnect the emergency power service and the normal power service. [Eff. 12/8/86; am and ren §12-230-4 and comp 12/6/90; am 11/5/93; am 7/6/98] (Auth: HRS §397-4) (Imp: HRS §397-4)

**§12-230-5 Firefighter's service - automatic elevators.** (a) All automatic (non-designated attendant) elevators shall conform to the requirements of this section.

- (1) For Phase I emergency recall operation, a three-position bypass off on key-operated switch with jewel indicator light shall be provided at the designated level for each single elevator or for each group of elevators. This switch shall be located 6 feet above the floor on the left hand side of the elevator wall when facing the elevator and 6 feet above the floor on the left hand side of the left elevator when facing the elevators for groups of elevators. A group of elevators is those serving a common lobby. The key shall be removable only in the "on" and "off" position. When the switch is in the "on" position, all elevators controlled by this switch and which are on automatic service shall return nonstop to the main floor, and the doors shall open and remain open. When the switch is in the "by pass" position, normal elevator service shall be restored independent of the smoke detector required by subsection (b) below.
- (2) When the switch is in the "on" position:
  - (A) All cars controlled by this switch which are on automatic service shall return nonstop to the designated level and power-operated doors shall open and remain open;
  - (B) A car traveling away from the designated level shall reverse at or before the next available floor without opening its doors;
  - (C) A car stopped at a landing shall have the in-car stop switch or emergency stop switch rendered inoperative as soon as the door is closed, and the car starts toward the designated level. A moving car, traveling to or away from the designated level, shall have the in-car stop switch or emergency stop switch rendered inoperative immediately. Once the in-car emergency stop switch has been rendered inoperative, it shall remain inoperative while the car is on Phase I emergency recall operation. All other stop switches shall remain operative; and
  - (D) A car standing at a floor other than the designated level, with the doors open and the in-car stop switch or emergency stop switch in the run position, shall conform to the following:
    - (i) Elevators having automatic power-operated horizontally sliding doors shall close the doors without delay and proceed to the designated level;
    - (ii) Elevators having power-operated vertically sliding doors provided with automatic or momentary pressure closing operation per ASME A17.1, rule 112.3d shall have the closing sequence initiated without delay in accordance with ASME A17.1, rule 112.3d(1), (2), (3), and (5), and the car shall proceed to the designated level; and
    - (iii) Elevators having power-operated doors provided with continuous pressure closing operation per ASME A17.1, rule 112.3b, or elevators having manual doors, shall, when the doors are closed, conform to the requirements of this subsection. Sequence operation, if provided, shall remain in effect.
  - (E) Door reopening devices for power-operated doors which are sensitive to smoke or flame shall be rendered inoperative. Mechanically actuated door reopening devices not sensitive to smoke or flame may remain operative. Door closing for power-operated doors shall conform to the requirements of ASME A17.1, rule 112.5.
  - (F) All car and corridor call buttons and all corridor door opening buttons shall be rendered inoperative. All call registered lights and directional lanterns shall be extinguished and remain inoperative. Position indicators, where provided, shall remain in service.
  - (G) Where provided on installation with vertical slide doors, corridor door open and corridor door close buttons shall remain operative.
  - (H) All cars shall be provided with a visual and audible signal system which shall be activated to alert the passengers that the car is returning nonstop to the designated level. The signal shall remain activated until the car has returned to the designated level.
  - (I) A car stopped at a landing shall have the door open button rendered inoperative as soon as the door is closed and the car starts toward the designated level. A moving car traveling to or away from the designated level shall have the door

open button rendered inoperative immediately. Once the door open button has been rendered inoperative, it shall remain inoperative until the car has returned to the designated or alternate level.

- (J) If an additional two-position Phase I switch is provided, it shall not affect Phase I operation if the designated-level smoke detector has been activated.
- (K) The "BYPASS" position on the three-position Phase I switch shall not restore the elevator to normal service if the two-position Phase I switch is in the "ON" position.

**(b)** Smoke Detectors. Smoke detectors shall be installed in each elevator lobby at each landing and associated machine room in accordance with NFPA 72E, Chapter 4. Smoke detectors are not required in elevator lobbies at unenclosed landings. Smoke detectors may be installed in any hoistway and shall be installed in hoistways which are sprinklered (see Rule 102.2 of ASME A17.1).

- (1) The activation of a smoke detector in any elevator lobby, other than at the designated level, shall cause all cars that serve that lobby to return nonstop to the designated level. The activation of a smoke detector in any elevator machine room shall cause all elevators having any equipment located in that machine room, and any associated elevators of a group automatic operation, to return nonstop to the designated level. The activation of a smoke detector in any elevator hoistway shall cause all elevators having any equipment located in the hoistway, and any associated elevators of a group automatic operation, to return nonstop to the designated level. The operation shall conform to the requirements of subsection (a)(1) and (2) above.
- (2) If the smoke detector at the designated level is activated, the operation shall conform to the requirements of subsection (a)(2) above, except that the cars shall return to an alternate level approved by the enforcing authority, unless the designated-level three-position Phase 1 switch is in the "ON" position.
- (3) Elevators shall only react to the first smoke detector zone which is activated for that group.
- (4) Phase 1 operation, when initiated by a smoke detector, shall be maintained until cancelled by moving the Phase 1 Switch to the "BYPASS" position. Smoke detectors and/or smoke detector systems shall not be self-resetting.

NOTE: In buildings with fire alarm systems, see NFPA 71A for additional information.

**(c)** Phase II Emergency In-Car Operation. A three-position ("OFF", "HOLD," and "ON," in that order) key-operated switch shall be provided in an operating panel in each car. It shall become effective only when the designated level Phase I switch is in the "On" position or a smoke detector has been activated, and the car has returned to the designated or alternate level by Phase I operation. The key shall be removable in each position. The "OFF" "HOLD," and "ON" positions shall not change the operation until the car is at a landing with the doors in the normal open position. The operation of elevators on emergency service shall be as follows:

- (1) An elevator shall be operable only by a person in the car;
- (2) All corridor call buttons and directional lanterns shall remain inoperative;

- (3) The opening of power-operated doors shall be controlled only by continuous pressure on the "open" buttons. If the button is released prior to the doors reaching the fully open position, the doors shall automatically reclose. Open doors shall be closed by continuous pressure on the door "close" button. If the door close button is released prior to the doors reaching the fully closed position, the doors shall automatically reopen. Cars installed prior to 1974 may use a key switch to close the car doors; however, when these cars are modernized, a door close button shall be installed. If the key switch is a three-position switch in which the third position is for "door close," the switch shall be spring loaded on the "door close" side to return the switch to the "on" position when released;
  - (4) All door reopening devices shall be rendered inoperative in accordance with subsection (a)(2)(E) above shall remain inoperative. Full speed closing is permitted. Corridor door closing buttons, if provided, shall be rendered inoperative;
  - (5) Every car shall be provided with a button marked "CALL CANCEL," located in the same car operating panel as the Phase II switch, which shall be effective during Phase II operation. When activated, all registered calls shall be cancelled and a traveling car shall stop at or before the next available landing;
  - (6) When the car stops for any registered car call, all other registered car calls shall be canceled;
  - (7) Floor selection buttons shall be provided in the car to permit travel to all floors served by the car. Means which prevent the operation of these buttons shall be rendered inoperative;
  - (8) When the Phase II switch is in the "HOLD" position, the elevator shall be on Phase II operation. The car shall remain at the landing with its doors open. The door close buttons shall be inoperative;
  - (9) When the Phase II switch is in the "OFF" position, the elevator is not at the designated level, and Phase I operation is in effect, the car shall revert to Phase I operation upon completion of door closing. Vertically sliding doors are not required to conform to the requirements of Rule 112.3d(3) and 112.5 of ASME A17.1 when the doors can only be closed by continuous pressure means;
  - (10) When the Phase II switch is in the "OFF" position and the car is not at the designated level, and Phase I is not in effect, the car shall remain at the landing with the doors open and the door-close buttons inoperative; and
  - (11) Elevators shall only be removed from Phase II operation when:
    - (A) The Phase II switch is in the "OFF" position and the car is at the designated level with the doors in the normal open position; or
    - (B) The Phase II switch is in the "OFF" position when Phase I is in effect.
- (d)** Interruption of power. Upon the resumption of power (normal or standby), the car may move to reestablish absolute car position.
- (e)** Multideck elevators shall also conform to the following requirements:
- (1) The Phase I switch shall be located at the designated level served by the upper deck; and
  - (2) The Phase II switch shall be located in the upper compartment. The elevator shall be provided with a means for placing the lower deck out of service, located in that deck or adjacent to the entrance at the lower lobby floor.
- (f)** All non-automatic elevators conform to the requirements of this subsection.
- (1) Phase I Emergency Recall Operation. A three-position key-operated switch shall be provided only at the designated level for each single elevator or for each group of elevators. The three-position switch shall be marked bypass off on with the "OFF" position as the center position. An additional two-position ("OFF" and "ON") key-operated switch may be provided at any location; however, it shall not affect Phase I operation if the designated-level smoke detector has been activated. All keys shall be removable only in the "OFF" and "ON" positions.
  - (2) No device, other than the Phase I switch(es) or the smoke detectors in the elevator lobbies, machine room or hoistway shall initiate Phase I operation.
  - (3) When all switches are in the "OFF" position, normal elevator service shall be retained and operation from the smoke detectors required by paragraph (8) below shall be function.
  - (4) When the designated-level three-position switch is in the "BYPASS" position, normal elevator service shall be restored independent of the smoke detectors required by paragraph (8) below.

- (5) A visual and audible signal shall be provided to alert the attendant to return nonstop to the designated or alternate level. The visual signal shall read "FIRE RECALL - return to (insert level to which the car should be returned (the designated or alternate level))." The signal system shall be activated when Phase I is in effect.
  - (6) If an additional two-position Phase I switch is provided, it shall not affect the visual signal if the designated-level smoke detector subsection (a)(2) has been activated.
  - (7) The "BYPASS" position on the three-position Phase I switch shall not restore the elevator to normal service if the two-position Phase I switch is in the "ON" position.
  - (8) Smoke Detectors. Smoke detectors shall be installed in each elevator lobby at each floor and associated machine room in accordance with NFPA 72E, Chapter 4. Smoke detectors are not required in elevator lobbies at unenclosed landings. Smoke detectors may be installed in any hoistway and shall be installed in hoistways which are sprinklered.
  - (9) Phase I operation, conforming to subsection (f)(1) shall be initiated when any smoke detector in the elevator lobbies, machine room, or hoistway is activated.
  - (10) Phase I operation, when initiated by a smoke detector, shall be maintained until cancelled by moving the Phase I Switch to the "BYPASS" position. Smoke detectors and/or smoke detector systems shall not be self-resetting.
- (g) Firefighters - Service - Automatic Elevators With Designated Attendant Operation.**
- (1) When on without-designated-attendant operation, elevators shall conform to the requirements of this section.
  - (2) When operated by a designated attendant in the car (except hospital service):
    - (A) Elevators parked at a floor shall conform to the requirements of subsection (a)(2)(G) above. At the completion of a time delay of not less than 15 seconds nor more than 60 seconds, elevators shall conform to the requirements of this section;
    - (B) A moving car shall conform to the requirements of this section; and
    - (C) When operated by a designated attendant in the car on hospital service, the visual and audible signal shall activate while Phase I is in effect.
- (h)** When an elevator which is provided with firefighter's service is on inspection operation, a continuous audible signal which is audible on top of the car shall sound when the Phase I switch(es) is in the "ON" position or when the smoke detector is activated to alert the operator of an emergency. Car shall remain under the control of the operator until removed from inspection operation or hoistway access operation. The top of car operating device shall take precedence over Phase I and Phase II operations.
- (i) Firefighter's Service Operating Procedure.**
- (1) Instructions for operation of elevators under Phase I shall be incorporated with or adjacent to the Phase I switch at the designated level. They shall include the wording shown in Figure 230-2.



- (2) Instructions for operation of elevators under Phase II shall be incorporated with or adjacent to the car. They shall include the wording shown in Figure 230-3.
- (3) Instructions shall be in letters not less than 1/8 in. (3.2 mm) in height and shall be permanently installed and protected against removal or defacement.

Figure 230-2

PHASE I INSTRUCTIONS

FIREFIGHTER'S OPERATION

To recall elevators  
Insert fire key and turn to "ON"

Figure 230-3

PHASE II INSTRUCTIONS

FIREFIGHTER'S OPERATION

To operate car	Insert fire key and turn to "ON" Press desired floor button
To cancel floor selection	Press "CALL CANCEL" button
To close door	Press and hold "DOOR CLOSE" button
To open door	Press and hold "DOOR OPEN" button
To hold car at floor	With doors open, turn key to "HOLD"
To return car to recall floor	With doors open, turn key to "OFF"

- (j) Requirements for keys.
- (1) The switches required by subsections (a)(1) and (c) above shall be operated by the same key but not part of a building master key system. There shall be a key for the main floor switch and for each elevator in the group. These keys shall be kept on the premises by persons responsible for maintenance and operation of the elevators or in a location readily accessible to authorized persons but not where they are available to the public;
- (2) The keys for the operation of this system described in subsection (a) above shall be kept in a firefighter's lockbox which shall be located adjacent to the key switch required by subsection (a)(1) above; and

- (3) The number of keys to be provided shall be one key for each key switch required by subsections (a)(1) and (c) above.

**(k)** There shall be sign within the firefighter's lockbox indicating the elevator service company and phone number.

**(l)** Elevator operation required by this section shall be checked during acceptance and periodic inspections.

**(m)** Firefighter's service inspection operation. When an elevator which is provided with firefighter's service is on inspection operation, a continuous audible signal which is audible on top of the car shall sound when the Phase I switch is in the "on" position or when the smoke detector is activated to alert the operator of an emergency. The car shall remain under the control of the operator until returned to service.

**(n)** Standby (emergency) power. When standby (emergency) power is furnished in conformance with ASME A17.1, rule 211.2, a manual elevator standby power selection switch shall be provided at the designated level to override any automatic sequence operation. If the manual elevator standby power selection switch is a key operated type, the switch keys shall conform to the requirements of ASME A17.1, rules 211.3d and 211.3e. [Eff. 7/12/82; am 12/19/83; am 12/8/86; am and ren §12-230-5 and comp 12/6/90; am 11/5/93; am 7/6/98] (Auth: HRS §397-4) (Imp: HRS §397-4)

**§12-230-6 Construction and maintenance work.** (a) Every elevator, dumbwaiter, escalator, moving walk, manlift, and inclined passenger lift, shall be maintained and operated by the owner or lessee in a safe condition and manner and in compliance with the requirements of this chapter.

(b) Construction, reconstruction, alteration and mechanical, or electrical work or adjustments that affect safe operation of any elevator and kindred equipment shall be performed only by qualified employees of companies holding the appropriate license from the contractors' licensing board of the department of commerce and consumer affairs, State of Hawaii, using elevator mechanics licensed by the department of commerce and consumer affairs.

(c) Assembly or repair by welding of any part of an elevator upon which safe operation depends shall be done in compliance with the applicable parts of ASME A17.1. Repairs, including sleeving, to cylinders of hydraulic elevators shall be performed by qualified welders using procedures complying with section IX of the ASME Boiler and Pressure Vessel Code. Prior to commencing welded repairs that come within the scope of these standards and codes, the department shall be notified and supplied with:

- (1) Sufficient information so that it can be determined if the contemplated work is allowed by the standards and codes; and
- (2) The name of the welder or contractor engaged to make the weldment, so it can be determined that the process, procedure, and the welder meet the requirements of the American Welding Society.

Completed weldments shall be inspected by the department or other authorized inspector, tested as deemed necessary by the inspector, and must be found to be satisfactory before the elevator is placed into service. Welding that comes within the scope of these standards and codes shall be considered a major alteration and a permit shall be obtained from the department as required by section 12-210-4(b) unless the welding is done in connection with the installation or alteration of an elevator for which a permit has been issued.

(d) Hoisting, compensating and governor ropes shall be replaced whenever their condition of deterioration equals or exceeds the limits established by Rule 103.4 of ASME A17.2. Replacement ropes shall be of a design suitable for each installation. They shall be installed in a manner that complies with acceptable standards for elevators. Each set of ropes shall have a metal data tag attached. The data tag shall bear the wire rope data required by Rule 212.2b of ASME A17.1. [Eff. 7/12/82; am 12/19/83; am 12/8/86; am and ren §12-230-6 and comp 12/6/90; am 11/5/93; am 7/6/98] (Auth: HRS §397-4) (Imp: HRS §397-4)

**§12-230-7 Safe operation. (a)** All elevators coming within the following descriptions shall be operated only by designated operators who have received instructions in the proper operation:

(1) All elevators intended for public use and having operating devices such as car switch, control, constant pressure push button, shipper rope, lever, or wheel type; or dual operation elevators while "on manual operation"; and

(2) All car switch or constant pressure push button operated elevators having a rated speed in excess of 150 feet per minute.

**(b)** No persons shall be designated to operate an elevator unless they are 18 years or older, free from mental or physical defects which would hamper their safe operation of the car and have received instruction in the proper and safe operation.

**(c)** Elevators shall be operated in a safe manner at all times.

**(d)** Elevator operators shall report to their employers whatever unsafe actions or conditions or defects in mechanism that may come under their notice. The operator shall not leave the elevator car unattended without having first secured the car against unauthorized use.

**(e)** The elevator landing area shall be kept free of debris or stored material at all times. [Eff. 7/12/82; am 12/19/83; ren §12-230-7 and comp 12/6/90] (Auth: HRS §397-4) (Imp: HRS §397-4)

**§12-230-8 Temporary use of permanent elevators. (a)** An elevator installed for permanent use may be used before completion, during construction of the building, for carrying workers and materials, provided the requirements of subsections (b) through (e) are met.

**(b)** The elevator and its hoistway, as a minimum, shall be equipped with:

- (1) An approved-type governor and car safety;
  - (2) A car with solid top and sides, except at car openings;
  - (3) A suitable hoistway enclosure of plywood or other materials extending from the floor to the ceiling;
  - (4) Approved-type doors or gates which fill the entire hoistway openings, equipped with interlocks or contact locks;
  - (5) A competent operator who shall be in charge of the elevator, with controls arranged so the operator will have control of the elevator at all times;
  - (6) A car door or gate equipped with an electric contact;
  - (7) A safe-load sign posted in the car;
  - (8) Controls appropriately labeled "up," "down," and "stop";
  - (9) An emergency alarm bell operable from the car; and
  - (10) An emergency stop switch in the car.
- (c)** The elevator shall satisfactorily meet these tests;
- (1) A running test with rated load with stops at various landings and at authorized speed;
  - (2) A test of the normal and final terminal stopping devices; and
  - (3) A test of the car-safety device and speed governor.

**(d)** A valid operating permit shall be authorized and posted in the car after being issued.

**(e)** A sign with letters not less than 1/2 inch in height shall be conspicuously posted in the car stating "For Construction Personnel and Materials Only". [Eff. 7/12/82; am 12/19/83; am 12/8/86; ren §12-230-8 and comp 12/6/90] (Auth: HRS §397-4) (Imp: HRS §397-4)

**§12-230-9 Protection during elevator and kindred equipment maintenance.**

Whenever an escalator is removed from operation, the entrance and exit shall be barricaded to prevent its use as a stairway. [Eff. 11/5/93] (Auth: HRS §397-4) (Imp: HRS §397-4)